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EXAMINER	
TRAN, P	
ART UNIT	**PAPER NUMBER**
2749	2

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/336,933	Applicant(s) Leifer et al.
	Examiner Pablo Tran	Group Art Unit 2749

☐ Responsive to communication(s) filed on _____ .

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) *1-55* is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1, 2, 8-18, 20, 21, 27-32, 38-47, and 52-55* is/are rejected.

☒ Claim(s) *3-7, 19, 22-26, 33-37, and 48-51* is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____ .

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

2. Claims 1-2, 8-18, 20-21, 27-32, and 38-47, and 52-55 are rejected under 35 U.S.C. 102(e) as being anticipated by *Robbins et al.* (5,973,638).

As per claims 1 and 31, *Robbins et al.* disclosed an apparatus for processing a set of received signals received from an antenna array of a wireless station or for processing a signal for transmission by from the antenna array, the apparatus comprising:

- a processor configured to compute a smart antenna processing strategy from a set of received signals to apply to received signals to determine an estimate of a user signal transmitted by a remote user or to apply to a signal for transmission to transmit the transmission signal to the remote user (fig. 1,2, col. 18/ln. 35-col. 19/ln. 10);

- a mechanism configured to modify the smart antenna processing strategy computed by the strategy computation process by incorporating interferer signature data for each of one or

more interferers, each interferer characterized by a signature data related to the signature of each of the interferers, such that the modified smart antenna processing strategy, if a downlink strategy applied on the downlink, decrease the transmitted strength in the direction of the one or more interferers, and if an uplink strategy applied on the uplink, decreases the sensitivity to signals from the direction of the one or more interferers (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col.23/ln 44-col. 24/ln. 67).

As per claims 2 and 32, *Robbins et al.* further disclosed wherein the modifying mechanism (b) further comprises:

- forming a combination as a function of the set of received data and interferer signature data for each of the interferers related to the signature each of the interferers, the combination incorporating the interferer signature data such that a smart antenna processing strategy is computed using the provided computation process with the formed combination as input, decrease the transmitted strength in the direction of the one or more interferers if a downlink strategy, and if an uplink strategy, decreases the sensitivity to signals from the direction of the one or more interferers (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67); and

- computing the smart antenna processing strategy by using the provided computation process with the combination formed in step (b) as input (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 8 and 38, *Robbins et al.* further disclosed wherein the combiner is further configured to combine the set of received data and an amount of a set of supplementary signal data determined from each interferer signature to form a combination signal data (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 9 and 39, *Robbins et al.* further disclosed wherein the amount is an adjustable amount defined by an adjustable parameter (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 10 and 40, *Robbins et al.* further disclosed wherein the adjustable parameter for any interferer is selected to be a number sufficiently large to ensure that the carrier to interference ratio (CIR) of the constituent parts of the combination signal data is small (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 11 and 41, *Robbins et al.* further disclosed wherein when the modified strategy is applied in the downlink the adjustable parameter for any interferer is selected to minimize total transmit power while the signal quality experienced by the remote user and at least one of the interferers meets or exceeds some prescribed quality of service (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 12 and 42, *Robbins et al.* further disclosed wherein when the modified strategy is applied in the downlink, the adjustable parameter for any respective interferer that is a co-channel user is selected to approximately maintain the same ratio of interferer power to remote user signal power in the combination signal data as the ratio of respective interferer power to

remote user transmit power used to transmit to the respective interferer and the remote user, respectively (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 13 and 43, *Robbins et al.* further disclosed wherein the set of supplementary signal data determined from the interferer signature data includes random samples formed from the interferer signature data (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 14 and 44, *Robbins et al.* further disclosed wherein the combiner forms a sum of the set of received data and the amount of the set of supplementary signal data determined from each interferer signature (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 15 and 45, *Robbins et al.* further disclosed wherein the combiner is further configured to perform a matrix factorization of the first set of received data and the signature data and to combine the resulting factors (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 16 and 46, *Robbins et al.* further disclosed (d) estimating the signature of at least one of the one or more interferers to form the interferer signature data for the respective interferer (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67)..

As per claim 17, *Robbins et al.* further disclosed wherein step (d) of estimating determines the maximum likelihood estimate of a particular interferer signature assuming no remote user signal and no other interferer signals are present (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claim 18, *Robbins et al.* further disclosed wherein step (d) of estimating determines the maximum likelihood estimate of a particular interferer signature assuming the remote user signal and all other interferer signals are present (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 20 and 47, *Robbins et al.* further disclosed wherein the interferer signature data for at least one of the one or more interferers includes a known signature for the respective interferer (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claim 21, *Robbins et al.* further disclosed applying the determined smart antenna processing strategy to process the a signal for transmission to the remote user (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 27 and 52, *Robbins et al.* further disclosed wherein applying the smart antenna processing strategy includes applying a set of weights, and wherein the smart antenna processing strategy computation process computes the set of weights and the step of modifying produces a modified set of weights (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 28 and 53, *Robbins et al.* further disclosed wherein the interferers are other remote users of the wireless station each having a corresponding weight for receiving from or transmitting to the wireless station, and wherein the modifying mechanism is configured to, for each weight of the set of weights corresponding to the remote user, for each interferer, add a constant multiplied by the corresponding weight for receiving from or transmitting to the interferer (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 29 and 54, *Robbins et al.* further disclosed wherein the constant for any interferer is selected to force the modified set of weights to be substantially orthogonal to the interferer signature (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

As per claims 30 and 55, *Robbins et al.* further disclosed wherein the constant for any interferer is selected such that when the modified strategy is applied on the downlink the total transmit power is minimized while the signal quality experienced by the remote user and at least one of the interferers meets or exceeds some prescribed quality of service (fig. 1,8,9A,9B,10A,10B, col. 18/ln. 25-58, col. 21/ln. 17-col. 22/ln. 28, col. 23/ln. 44-col. 24/ln. 67).

Allowable Subject Matter

3. Claims 3-7, 19, 22-26,33-37, and 48-51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Barratt et al. (5,592,490), Robbins et al. (5973,638), Soliman (5,675,581), Scherzer (6,108,565), Liu et al. (5,905,721), Dean (5,565,873), Xu et al. (6,005,854), Shattil (5,955,992), Smith et al. (6,009,124), Parish (6,023,203) disclose base station antenna arrangement.

5. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Pablo Tran whose telephone number is (703)308-7941. The fax number for this Group is (703)308-6306 and (703)308-6296.

Any inquiry of a general nature to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703)305-3900.

August 28, 2000

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Pablo Tran

Examiner, Art Unit 2749